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Small Quantity Generator's Handbook for Managing RCRA (Resource Conservation and Recovery Act) Wastes Automotive and Heavy Equipment Maintenance

Science Applications International Corp., Bellevue, WA

Prepared for:

Montana State Dept. of Health and Environmental Sciences, Helena

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Abstract: The Resource Conservation and Recovery Act (RCRA) Handbook was developed for vehicle and heavy equipment maintenance businesses to assist them in complying with pertinent sections of the requirements. It provides procedures to minimize the costs of complying with the RCRA requirements by minimizing waste quantities and by focusing the facility manager's attention on those parts of the RCRA regulations that are relevant to normal operations at vehicle maintenance facilities. It also identifies special Montana regulations applicable to vehicle maintenance facilities. Various sections of the manual include: description of facility operations and the wastes generated as a result of their operations; a discussion of hazardous wastes generated and the RCRA regulations that specifically apply to them; RCRA generator requirements; and hazardous and non-hazardous waste management strategies. The appendices provide: information regarding the acute and toxic commercial chemical products and wastes (f, p, and u wastes); procedures for identifying characteristic hazardous wastes in vehicle maintenance facilities; and a list of references and contacts for obtaining additional information about hazardous wastes and their regulation.

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THE SMALL QUANTITY GENERATOR'S HANDBOOK FOR MANAGING RCRA WASTES

- AUTOMOTIVE AND HEAVY EQUIPMENT MAINTENANCE -

STATE OF MONTANA
DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
HELENA, MONTANA

JUNE, 1988

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- AUTOMOTIVE AND HEAVY EQUIPMENT MAINTENANCE -

Prepared for:

State of Montana
Department of Health and Environmental Sciences
Helena, Montana

Prepared by:

Science Applications International Corporation
Bellevue, Washington

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1.0 INTRODUCTION

In 1976, Congress, recognizing that the problem of solid and hazardous waste disposal had become a national concern, passed the Resource Conservation and Recovery Act (RCRA). This legislation was designed to address two major problems:

- The dangers to human health and the environment posed by improper waste disposal.
- The conservation of valuable material and energy resources.

Subtitle C of RCRA establishes a "cradle-to-grave" hazardous waste management system, which is administered by the U.S. Environmental Protection Agency (U.S. EPA). This system provides for managing, tracking, and regulating hazardous wastes at each step of the way from generation to final disposal. The regulations developed by U.S. EPA apply to those who generate, transport, treat, store, or dispose hazardous wastes.

This RCRA Handbook was developed for vehicle and heavy equipment maintenance businesses to assist them in complying with pertinent sections of the requirements. It provides procedures to minimize the costs of complying with the RCRA requirements by minimizing waste quantities and by focusing the facility manager's attention to those parts of the RCRA regulations that are relevant to normal operations at vehicle maintenance facilities.

The information on vehicle maintenance facilities operations in this document was compiled through site visits to various types of maintenance facilities to identify hazardous and non-hazardous wastes and to observe current waste management procedures. Following these visits, a review of the RCRA requirements and Administrative Rules of Montana (ARM) was performed to identify specific regulations applicable to vehicle maintenance facilities.

Section 2.0 of this manual describes facility operations and the wastes generated as a result of these operations. Section 3.0 discusses the hazardous wastes generated and the RCRA regulations that specifically apply to them. Section 4.0 discusses the RCRA generator requirements. Section

5.0 describes hazardous and non-hazardous waste management strategies for minimizing waste generation and handling waste. Appendix A provides information regarding the acute and toxic commercial chemical products and wastes (F, P, and U wastes). Appendix B describes the procedures for identifying characteristic hazardous wastes in vehicle maintenance facilities. Finally, Appendix C provides a list of references and contacts for obtaining additional information about hazardous wastes and their regulation.

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2.0 OPERATIONS AND WASTE STREAM CHARACTERIZATION

The operations of vehicle maintenance facilities and the waste streams generated are briefly discussed in the following section. The types of facilities examined include radiator repair shops, auto repair/maintenance, auto body repair, and heavy equipment repair. The facilities all have some common practices and generate many similar waste streams, even though their daily operations may differ significantly.

2.1 SUMMARY OF OPERATIONS

2.1.1 Radiator Repair Shops

Generally, radiator repair shops receive damaged radiators that have already been removed from the vehicle. Dirt and grime are removed from the outside of the radiators by pressure washing. This step is generally accomplished outside the building and may or may not be done on a concrete pad. This operation may also be done inside a building over a sump or floor drain. Cleaning booths are also used by shops to remove dirt and grime from the radiators. Glass beads are discharged from a high-pressure hose in an enclosed area to facilitate dirt and grime removal. Next, the radiator is placed in a "hot tank", typically containing a hot caustic solution, to remove scale and other deposits from the interior of the radiator. Many shops have switched to ultrasonic tanks, which utilize a smaller amount of caustic soda and low frequency sound waves to remove deposits. After removal from the hot tank or ultrasonic tank, the interior of the radiator is flushed. The rinse water is generally drained to the sewer. The cleaned radiator is then placed in a test tank, where it is carefully examined for leaks. Once the leaks are located, they are repaired with solder. Any excess solder falls back into the test tank. After the radiator is repaired, it may be painted, or simply stored for later pickup.

2.1.2 Auto Maintenance/Repair

Auto maintenance/repair shops perform a variety of services for their customers, ranging from routine maintenance to specialized repair. However, most of these shops do not repair radiators or perform auto body work. Services include oil changes and lubrication, engine and transmission

repair, brake and other non-engine related repair, battery replacement, and electrical system repair. During routine operations, motor, lubrication, and transmission oils may be drained. Solvents may be used to clean parts removed from the vehicle. Facilities may also use hot tanks filled with caustic solution to clean parts. Brakes (possibly asbestos-lined) and batteries may be replaced.

2.1.3 Auto Body Repair

Auto body repair shops primarily deal with collision-damaged cars, cars requiring body work due to rust, and cars requiring painting for aesthetic purposes due to the oxidation of the top paint layer. Operations typically involve pulling dents or repairing other collision damage, sanding the paint down to metal, using body filler to repair holes, priming the metal surface for the finish painting, and application of the final coats of paint. Most painting is accomplished by using a spray gun, which must be cleaned with paint thinner after each use.

2.1.4 Heavy Equipment Repair

Heavy equipment repair includes farm implements, diesel truck rigs, large construction equipment such as caterpillars and dump trucks, and small air craft maintenance. These shops provide services very similar to those provided by the auto maintenance/repair facilities. Once again, very few of these shops perform radiator repair service. Operations entail the removal and cleaning of parts for examination and rebuilding or replacing. Drainage of oils to service engines, clutches, axles, transmissions, and brakes is also part of routine operations. Solvents or hot tanks are used for parts cleaning in a manner similar to the auto maintenance shops. The majority of antifreeze drained is saved and re-used after the repair work has been completed. Some painting is also performed and the use of paint guns is typically employed for this operation. Paint guns are cleaned with paint thinner after each use.

Small aircraft maintenance generates very similar wastes to the above. In addition, off-specification aviation gasoline is occasionally generated by these facilities. Typically, the off-spec fuel is added to a used oil tank.

2.2 SUMMARY OF WASTE STREAMS

This section discusses in greater detail, the waste streams generated as a result of daily operations for the different facilities. Many of the facilities have at least one waste stream in common, as services offered by the different shops overlap to some extent. Quantities of wastes generated may vary significantly from facility to facility, primarily as a function of the volume of business and the repair procedures used.

2.2.1 Used Oils

The waste oils generated by vehicle maintenance facilities include mainly motor oil, transmission fluid, and brake fluid. Used hydraulic oils, gear oils, compressor, turbine and bearing oils also contribute to the volume of used oil produced. The volume of waste oil generated ranges from 200 gallons/year to 6,000 gallons/year depending principally on the size of the facility. The waste oil may be stored in above-ground or underground tanks, or 55-gallon drums. The waste oil mixture may be burned to reclaim the heating value or hauled off-site. Other facilities store waste oils in 55-gallon drums for an unlimited amount of time.

2.2.2 Spent Solvents

Spent solvents are generated primarily from parts washers and carburetor cleaners. A variety of solvents are used, including Stoddard solvent and the chlorinated solvents, such as methylene chloride or trichloroethane. Quantities of waste solvents generated range from 30 to 500 gallons per year. Current disposal practices include mixing solvents with waste oils for burning or off-site disposal, recycling through a contracted hazardous waste management service, on-site recycling, or storage in 55-gallon drums. On-site drum storage of solvents occurs mainly in areas of Montana not serviced by hazardous waste management services.

The waste solvents also contain sludge generated during the cleaning process. The solvent suspends or dissolves the dirt, oil and grease and this loosened material is washed from the part with clean solvent into a basin. Typically, a 55-gallon drum of waste solvent produces two to three gallons of sludge. Sludge is periodically removed from parts washers in order to

extend the life of the solvent. The sludge may be deposited in a dumpster for eventual disposal in a licensed Class II sanitary landfill by those facilities who do not use a hazardous waste management service, and who are conditionally exempt generators (see Section 4.0).

2.2.3 Hot Tank Wastes

Hot tanks, containing caustic solutions, are used by auto repair and heavy equipment repair shops, as well as by radiator repair shops. The rectangular tanks vary in volume from approximately 50 to 150 gallons. The solution is typically produced by dissolving sodium hydroxide pellets in water. This mixture is then heated to enhance the penetrating action for dissolving grime on parts or removing deposits from the inside of radiators. This process produces a sludge which settles to the bottom of the tank. Some of the sludge generated from cleaning older radiators may contain heavy metals such as lead, zinc, and copper, however, the bulk of the material is sand and fine sediment. Sludge may be disposed in a dumpster, with eventual disposal in a landfill. Some shops may evaporate the free liquids from the sludge before disposal.

The caustic solution is used until there are too many suspended solids present and the solution gets too weak to effectively clean metal. At this point, the solution may be neutralized with a moderately strong acid and discharged to the sewer system. Many radiator shops simply replenish the solution by adding more sodium hydroxide and removing the sludge.

2.2.4 Paint Thinners

Paint thinners are mixed with paint to achieve a desired consistency for painting and are also used to clean the paint guns which are used to apply the paint. Paint thinners are usually a derivative of naphtha or turpentine. Paint thinner for both enamel and lacquer paints is mixed with paint and generally consumed in the painting process. Some container residues may remain which cannot be applied due to limitations of the equipment to completely use all of the paint. Waste paint thinner is generated primarily as a result of cleaning paint spray guns and other equipment. Quantities of waste thinners generated by auto body shops range between 15 to 300 gallons per year. The waste is typically stored in drums until enough has been

accumulated to distill on-site or removed by a hazardous waste management service for recycling or incineration. On-site distillation systems produce a gelatinous paint sludge material often referred to as a "still bottom". This material consists of residual thinners and paint residues. These paint residues may contain zinc, chromium, cadmium, lead, nickel, and mercury, used as pigments and paint additives.

2.2.5 Paint Residues

Paint residues are generated from incomplete use of a container of paint and as a result of adhesion of the paint to the bottom and sides of a container after pouring or pumping of the product. If the paint was mixed with thinner in its original container, residual thinners would also be present. Paint residues also contain heavy metals used as pigments and paint additives.

2.2.6 Paint Booth Filters

Paint booths are used in many auto body facilities as well as some of the larger vehicle maintenance facilities. The booths provide a controlled environment for collection of overspray from vehicle painting. Air from the paint booth passes through a filtering system to remove suspended paint particles and organic vapors. Eventually, the filters are clogged with paint and solvent. Some filters may be cleaned and reused. Others may be placed in a dumpster for eventual disposal at a landfill.

2.2.7 Antifreeze

Small quantities of waste antifreeze are generated by radiator repair shops, auto repair shops and heavy equipment repair facilities. Generally, the facilities try to save and re-use antifreeze when it is drained from a radiator. Antifreeze is generally diluted and discharged to the sewer when it is no longer usable.

2.2.8 Batteries

Lead-acid batteries which can no longer hold a charge or have been damaged must be taken out of service and disposed or reclaimed. Spent batteries are occasionally collected by auto repair and heavy equipment repair facilities.

Most facilities do not drain the batteries; they are stored until picked up for off-site reclamation.

2.2.9 Brake Linings and Clutch Facings

Asbestos brake linings are generated as a waste material when brake work is required and the pads must be replaced. The brake pads are generally returned to the manufacturer for relining, although some facilities may discard them into a dumpster with eventual disposal into a landfill. Small amounts of asbestos dust are released to the atmosphere when the brake shoes are pulled. Due to the very fine nature of the dust it is very difficult to contain this material. Asbestos brake materials are slowly being phased out as new synthetic materials are taking its place. Clutch plate facings also contain an asbestos lining which must be disposed. Typically, the waste clutch facings are thrown into the dumpster.

2.2.10 Shop Towels

Dirty shop towels are generated by all four types of facilities. The towels are soiled primarily with oil, grease, and solvents. Generally, the towels are taken to an industrial laundry for cleaning. Disposable towels are thrown into the trash and disposed in the landfill.

2.2.11 Spill Material

Material spilled on the floor can be essentially any of the wastes mentioned above. Spilled oils are generally cleaned up using an absorbent material and then deposited in a dumpster for landfill disposal. Spills of other fluids may be washed to a sump for eventual discharge to a sewer or septic tank, or to be pumped out for off-site disposal.

2.1.12 Glass Beads

The glass beads used by radiator shops to clean the outside of radiators produce waste consisting of spent beads, dirt, and grime. The combined waste mixture is collected and disposed in a dumpster for eventual disposal in a sanitary landfill. Glass beads in good condition are typically reused.

3.0 HAZARDOUS WASTE REGULATIONS

3.1 FEDERAL HAZARDOUS WASTE REGULATIONS

The Federal regulations governing the management of hazardous wastes are specified under the Resource Conservation and Recovery Act (RCRA). The objectives of RCRA are to improve the management of wastes to protect the environment and human health, and to conserve valuable materials and energy resources. The RCRA regulations are specified in the Code of Federal Regulations (CFR), Title 40, Parts 260 through 272. The Environmental Protection Agency has the authority to administer the RCRA program.

3.2 STATE HAZARDOUS WASTE REGULATIONS

In the State of Montana, the Department of Health and Environmental Science (DHES) has been given the authority from EPA to develop and administer a hazardous waste management program. EPA requires that the development and administration of this state program is consistent with federal standards set forth in the RCRA regulations. The State has developed hazardous waste management regulations under the Montana Hazardous Waste Act of October 1, 1985, which are specified in the Administrative Rules of Montana, Title 16, Chapter 44. This state program incorporates the Federal RCRA standards and includes additional requirements that were developed for the classification, generation, storage, treatment, and disposal of hazardous wastes.

3.3 HAZARDOUS WASTE CLASSIFICATION

RCRA and Administrative Rules of Montana (ARM) have established certain standards and criteria based on waste characteristics and management practices to determine whether or not a waste is considered a hazardous waste. If a waste is determined to be hazardous, specific regulations under RCRA and ARM apply to the management of that waste including storage, treatment, and disposal of the waste.

There are two ways a waste may be brought into the hazardous waste regulatory system: listing and identification through characteristics. These classifications are summarized below:

- Listed Wastes - A waste may be considered hazardous if it appears on any one of four lists of hazardous wastes contained in the RCRA regulations. These wastes have been listed because they exhibit one or more of the characteristics described below or contain any number of toxic constituents that have been shown to be harmful to human health and the environment. The RCRA regulations list over 400 hazardous wastes, including wastes derived from non-specific sources (F Wastes), manufacturing processes (K Wastes), and discarded chemical products (P and U Wastes). These lists can be found in the CFR, Title 40, Part 261, Subpart D. The F, P, and U lists are also found in Appendix A.

- Characteristic Wastes - Even though a waste does not appear on one of the above hazardous wastes lists, it may be considered a hazardous waste if it exhibits certain characteristics. A waste may be considered hazardous if it exhibits any one of the following characteristics: ignitable, corrosive, reactive, or EP toxic. These specific characteristics and criteria for identifying the RCRA characteristic wastes are described in detail in Appendix B. These characteristics are referenced in the CFR, Title 40, Part 261, Subpart C.

3.4 APPLICABILITY OF FEDERAL AND STATE HAZARDOUS WASTE REGULATIONS TO VEHICLE MAINTENANCE FACILITIES

Wastes generated from vehicle maintenance facilities may be subject to the RCRA and ARM hazardous waste regulations, depending upon how they are managed and on their specific characteristics. The determination of applicable hazardous waste regulations is a two step process involving: (1) determining types of wastes generated and how each waste type is managed, and; (2) determining if a particular waste is classified as a hazardous waste. This approach is used to discuss the applicability of RCRA and ARM regulations to wastes generated by vehicle maintenance facilities in the sections which follow.

3.4.1 Used Oils

Used oil is defined as any oil that has been refined from crude oil, used, and as a result of such use, contaminated by physical or chemical impurities. Currently, used oils include: (1) spent automotive lubricating oils, transmission fluid, brake fluid, and off-road engine oil; (2) spent industrial oils, including compressor, turbine, and bearing oils, hydraulic oils, metal working oils, gear oils, electrical oils, refrigerator oils, and railroad oils; (3) spent industrial process oils; and (4) off-specification aviation fuels containing water. Used oils are currently only regulated by

RCRA and ARM hazardous waste rules if they meet one or more of the following conditions:

- Used oils which are ignitable (i.e., off-spec aviation fuels).
- Used oils mixed with listed hazardous waste, or mixed with a characteristic hazardous waste such that the whole mixture exhibits the characteristic.
- Used oils burned for energy recovery in industrial and non-industrial boilers.
- o Used oils with more than 50 parts per million PCB contamination.

These conditions are described in more detail below.

Used Oil Mixed with Hazardous Waste - The addition of a listed or characteristic hazardous waste to used oil may classify the entire mixture as hazardous the moment the hazardous waste is added. This rule applies to any of the solvents containing components listed in Table 1, or any solvents or off-spec fuels which are ignitable (D001). The resulting hazardous waste mixture must be treated according to the guidelines discussed in Section 4.0 of this manual.

Burning Used Oil for Energy Recovery - Many facilities burn waste oil in used oil-fired space heaters to heat their facility during the cold weather months. In order to do this and not be subject to hazardous waste regulation, the most important thing to remember is that used oils should never be mixed with listed or characteristic hazardous wastes. Failure to comply with these requirements may result in the entire mixture being regulated as a hazardous waste. This may mean that the generator of the used oil is no longer a small generator, and thus would be subject to the requirements of large generators, and the fuel burning requirements for hazardous waste incinerators.

Used oils may be classified as either off-specification used ("off-spec") oil or used oil that meets certain specifications ("spec oil"). The RCRA regulations have established concentration limits for specific constituents

Table 1

COMMON SOLVENTS AND CLASSIFICATIONS

EPA Hazardous Waste Number	Active Chemical	Hazard Code
F001 (halogenated solvents used in degreasing)	Tetrachloroethylene Trichloroethylene Methylene Chloride 1,1,1-Trichloroethane Carbon Tetrachloride Chlorinated Fluorocarbons	Toxic
F002 (halogenated solvents)	Tetrachloroethylene Methylene chloride Trichloroethylene 1,1,1-trichloroethane Chlorobenzene	Toxic
F003 (non-halogenated solvents)	Xylene Acetone Ethyl Acetate Ethyl Benzene Ethyl Ether Methyl Isobutyl Ketone n-Butyl Alcohol Cyclohexane Methanol	Ignitable
F004 (non-halogenated solvents)	Cresols Cresylic acid Nitrobenzene	Toxic
F005 (non-halogenated solvents)	Toluene Methyl Ethyl Ketone Carbon Disulfide Isobutanol Pyridine Benzene 2-Ethoxyethanol 2-Nitropropane	Ignitable and Toxic
D001 (non-halogenated solvents)	Stoddard Solvent Petroleum Distillates Naptha Isopropanol Kerosene Ethanol	Ignitable

Source: 40 CFR 261, Subpart D.

in the waste oil. The used oil is termed off-specification if any of these concentration limits are exceeded. The constituents and concentration limits are:

Arsenic	5 parts per million (ppm) maximum
Cadmium	2 ppm maximum
Chromium	10 ppm maximum
Lead	100 ppm maximum
Flash Point	100°F minimum
Total Halogens	4000 ppm maximum

The generator of the used oil may burn his own used oil if it exceeds the above parameters provided that the following conditions are also met:

- The used oil-fired space heater burns only used oil that the owner or operator generates or used oil received from do-it-yourself oil changers who generate used oil as household waste.
- The heater is designed to have a maximum capacity of not more than 0.5 million (500,000) Btu per hour.
- The combustion gases from the heater are vented to the ambient air.

The generator who has a used oil-fired space heater may only burn the off-specification used oil he generates; he may not burn his neighbor's used oil unless he can document that the used oil meets specification. To determine that a used oil meets specification, the used oil must be sampled and sent to a laboratory for analysis. If a chemical analysis of the used oil is undertaken and the oil is found to meet specification, the records documenting this fact should be kept for a minimum of three years.

3.4.2 Spent Solvents

A spent solvent is defined as one that is no longer fit for use without being regenerated, reclaimed, or otherwise reprocessed. These spent solvents may be classified as hazardous wastes under RCRA based on their listing. Solvents are typically listed as "F Wastes" or characteristic wastes (D001) due to ignitability. Table 1 lists common chemical components of solvents and the five categories of solvent waste (F Wastes). These five categories of solvent waste have the EPA Waste Codes of F001, F002, F003, F004, and F005 which consist of certain spent halogenated and

non-halogenated solvents. Sludges or still bottoms generated from the on-site distillation and recovery of these solvents are also included in these categories. Many of the solvents used in vehicle maintenance facilities for parts cleaning and paint thinners fall into one of these categories and therefore must be managed as hazardous wastes.

3.4.3 Hot Tank Wastes

Wastes generated from hot tanks include the caustic solution and the tank bottom sludge material. The hot tank solution and sludge may possess waste characteristics identified as corrosivity and EP toxicity (see Appendix B), and thus be classified as a hazardous wastes. Hot tank waste is subject to regulation only if it meets one of the following conditions:

- The hot tank wastewater has a pH greater than 12.5 units (corrosive) and/or the bottom sludge is EP toxic and the mixture is not discharged to the sanitary sewer. The entire mixture is then a hazardous waste.
- The bottom sludge is EP toxic due to its leachable metal content (lead) and/or corrosive and it is removed from the hot tank prior to discharge of the wastewater to the sanitary sewer system. The bottom sludge then becomes a hazardous waste.

Hot tank wastewaters and bottom sludge that are considered RCRA regulated hazardous wastes and are not discharged to sanitary sewers with domestic sewage are subject to the generator requirements as detailed in Section 4.0.

Sanitary Sewer Discharge - Hot tank wastewaters discharged to the sanitary sewer system are subject to local restrictions or limitations. Municipalities or city governments establish restrictions or limitations on specific parameters in the wastewater to protect the wastewater treatment facility. Toxic parameters present in the hot tank wastewaters may interfere with or disrupt the operation of the wastewater treatment facility. These discharge restrictions or limitations are often imposed through a local sewer use ordinance, administrative code, or permit system. Businesses intending to discharge hot tank wastewaters to the sanitary sewer system must check with their local government to determine what restrictions or limitations apply and if a discharge permit is required.

Hot tank wastewater that is discharged to a sanitary sewer system where it is collected and treated in a municipal wastewater treatment facility is not subject to the RCRA and ARM hazardous waste regulations. These wastewaters, even though they may be RCRA-listed wastes or exhibit RCRA characteristic wastes, are excluded from RCRA and ARM control based on the domestic sewage exemption. For this exemption to apply, the hot tank wastewater must be discharged along with domestic sewage to a municipal wastewater treatment facility. If the hot tank wastewaters are not discharged along with domestic sewage, then the domestic sewage exemption does not apply and the wastewaters may be subject to the RCRA and ARM regulations.

Surface Water Discharges - Businesses discharging to a surface water are required to obtain a discharge permit (NPDES Permit) from the Montana DHES Water Quality Bureau. To meet the discharge limitations, the process wastewaters must generally be treated on-site prior to discharge. Businesses intending to discharge hot tank wastewaters to surface water must contact DHES and their local government. Hazardous wastes cannot be discharged to surface waters. Hot tank wastewaters discharged to a surface water, such as a direct discharge to a lake or stream, or to a storm sewer, are not subject to the RCRA and ARM regulations. These permits place restrictions and limitations on specific wastewater parameters that can be discharged.

3.4.4 Batteries

Persons who generate, transport, or collect spent batteries, or who store spent batteries but do not reclaim them are not subject to regulation, as stated in 40 CFR 266.80, Subpart G. Batteries may be stored for an unlimited period of time prior to being recycled. The acid and metals in the batteries are hazardous waste once they are removed from the batteries.

3.4.5 Paint Residues

Paint residues may exhibit the hazardous waste characteristic of ignitability. Paint residues may also exhibit the characteristic of EP toxicity if metals, such as lead and chromium, were used as pigments or additives. Paint residues classified as hazardous wastes are subject to regulation if the residues are improperly managed. The paint residues in the containers are not subject to regulation if the containers are classified as empty.

This classification is determined as follows:

- All wastes have been removed that can be removed using the practices commonly employed to remove materials from that type of container, e.g., pouring, pumping and aspirating, and
- No more than 2.5 centimeters (one inch) of residue remain on the bottom of the container, or
- No more than 3 percent by weight of the total capacity of the container remains in the container, if the container is less than or equal to 110 gallons in size.

Paint containers classified as empty may be disposed in a sanitary landfill.

3.4.6 Paint Filters

The air filters used in paint booths remove paint particulate material and vent the cleaned air to ambient air. The classification of the air filters as hazardous depends on the classification of the paint wastes generated. Generators should determine if filters exhibit the hazardous waste characteristics of EP toxicity or ignitability through suitable analysis. Paint wastes classified as hazardous are subject to the requirements specified in Section 4.0.

3.4.7 Glass Beads

The glass beads used to sandblast the radiators clean often contain lead. Therefore, the waste produced by the glass beads may be EP toxic for lead. The generator should have a representative sample of the waste analyzed for EP toxicity. If the test shows the waste to be EP toxic, the waste must be managed according to the requirements specified in Section 4.0.

4.0 HAZARDOUS WASTE GENERATOR REQUIREMENTS

4.1 BACKGROUND

The Environmental Protection Agency (EPA) and the Montana Department of Health and Environmental Science (DHES) classify generators of hazardous waste in three categories according to the amount of waste they generate. This classification was done in response to public attention to the fact the inappropriate management of even small quantities of hazardous waste can result in health or environmental problems. Depending on which generator category applies to a specific business, certain precautions or actions may be required in the management of hazardous wastes.

4.2 CATEGORIES OF GENERATORS

Businesses that generate 1,000 kilograms or more (2,200 pounds) per month of hazardous waste (or one kilogram per month of acute hazardous waste) must abide by all of the requirements of the law, and are not eligible for any exemptions. These are classified as large hazardous waste generators. Requirements for this category are not addressed in this manual.

Businesses generating between 100 kilograms and 1,000 kilograms (220 pounds to 2,200 pounds) per month of hazardous waste have been designated as **SMALL GENERATORS** and are allowed some special provisions. Finally, businesses that generate less than 100 kilograms (220 pounds) per month of hazardous waste are designated as **CONDITIONALLY EXEMPT GENERATORS**.

4.3 REQUIREMENTS FOR ALL GENERATORS

Each of the requirements that are described below apply to all generators, regardless of quantity. These are summaries of the Federal regulations and the State of Montana's regulations. The Federal regulations for hazardous waste generators are found in the Code of Federal Regulations, Title 40, Parts 261 and 262 (40 CFR 261 and 262) and are administered by EPA. The State of Montana's rules for hazardous waste generators are found in the Administrative Rules of Montana, Title 16, Chapter 44, and administered by DHES.

It is important to note that the Federal laws apply nationwide. In some cases, requirements that have been added to the original Federal laws have not yet been adopted by the State of Montana. Even if the State has not yet adopted certain requirements from the Federal law, businesses are still required to abide by these Federal requirements. In addition, the State of Montana may have developed special requirements to address special problems within the state.

- All generators must determine which of the wastes they generate are hazardous. Sections 2.0 and 3.0 of this guidance manual contains descriptions of the hazardous wastes generated in a specific type of business. [40 CFR 262.11, ARM 16.44.402]

- All generators must segregate <u>listed</u> (F, K, P and U) hazardous wastes from non-hazardous wastes. Listed hazardous wastes are materials that have been specifically catalogued and are always considered hazardous. MIXING THESE WASTES WITH NON-HAZARDOUS WASTE WILL MAKE THE ENTIRE VOLUME A HAZARDOUS WASTE. Sections 2.0 and 3.0 and Appendix A of this guidance manual identified list hazardous wastes that may be generated in your business. Listed wastes that may be generated from vehicle maintenance facilities include cleaning solvents and paint thinners.

- Under certain circumstances, generators may mix characteristic hazardous wastes and non-hazardous wastes if they are compatible (not reactive or explosive, etc.). The mixture is considered non-hazardous only if it no longer meets the characteristics of a hazardous waste. IF THE MIXTURE IS A WASTE EXHIBITING A HAZARDOUS CHARACTERISTIC, THE ENTIRE MIXTURE BECOMES A HAZARDOUS WASTE, AND THE SMALL GENERATOR MAY BECOME A LARGE GENERATOR AS A RESULT. Section 3.0 and Appendix B of this guidance manual identify the characteristics of hazardous waste that may apply to your business.

- In the event of a hazardous waste spill, all generators must treat spilled hazardous wastes, clean-up residues, and containers as hazardous wastes.

- All generators must use containers that are compatible with the hazardous waste they are to contain. Containers should be sealed and free from leakage.

- All generators of hazardous waste must ensure their wastes are delivered to an off-site facility that is authorized by EPA or the state in which the receiving facility is located to receive municipal, industrial, or hazardous waste. The type of facility depends on the category of the generator.

- All generators must ensure that off-site shipments of hazardous waste are labeled, marked, and placarded according the U.S. Department of Transportation (DOT) requirements. This includes a

U.S. DOT waste description, shipping name, hazard class, and identification number. Any questions about DOT shipping requirements can be referred to the Montana State Department of Transportation. [40 CFR 262.30 to 262.33]

- A Hazardous Waste Manifest is required when shipping hazardous wastes off-site. The standard form is the U.S. EPA manifest form 8700-22, which is processed by DHES. [ARM 16.44.405]

4.4 REQUIREMENTS FOR CONDITIONALLY EXEMPT GENERATORS

A business qualifies as a Conditionally Exempt Generator if no more than 100 kilograms (220 pounds) per month of hazardous waste and no more than 1 kilogram (2.2 pounds) per month of acutely hazardous waste are generated. Acutely hazardous wastes are listed in Table A-1 of Appendix A. Typically, vehicle maintenance facilities do not generate any of these acute hazardous wastes. No more than 1,000 kilograms (2,200 pounds) of hazardous waste can be accumulated on-site or on your property. There is no time limit for this accumulation, as long as the 1,000 kilogram storage limit is not exceeded.

As a rule of thumb, a 55-gallon drum of hazardous waste is about 200 kilograms (440 pounds). This means that the business must generate less than one-half of a 55-gallon drum of hazardous waste per month or accumulate no more than five 55-gallon drums at any one time.

As long as the above two conditions are maintained, a business falls into a category called "conditionally exempt". The business must still meet all of the requirements presented in Section 4.3 of this manual, but it is conditionally exempt from other requirements for generators of hazardous wastes.

Examples of how a business can lose conditionally exempt status are:

- The business generates less than 100 kilograms per month eleven months out of the year, and more than 100 kilograms in the twelfth month.
- The amount of hazardous waste accumulated by a business exceeds 1,000 kilograms.

If hazardous waste management practices result in a business losing its conditionally exempt status, all requirements for Small Generators must be met. These are listed in Section 4.5 of this manual.

As long as the business meets the requirements of this section, hazardous waste may be disposed at a hazardous waste facility, or a licensed Class II sanitary landfill or other facility approved by the State of Montana for industrial or municipal wastes on the condition that the operating authority of the landfill accepts the waste.

4.5 REQUIREMENTS FOR SMALL GENERATORS

Small generators are businesses generating between 100 and 1,000 kilograms (220 to 2,200 pounds) of hazardous waste per month. If a business falls in this category, it also may not generate more than 1 kilogram (2.2 pounds) per month of acute hazardous waste (see Appendix A, Table A-1 and Section 3.3), and may not accumulate on-site more than 6,000 kilograms of hazardous waste. Businesses in this category must meet the following requirements:

Identification

- Small generators must have an EPA identification number. This twelve-digit number is part of a national data base to track hazardous waste activities for generators, transporters, disposal facilities, etc. In order to obtain an EPA identification number, contact the State of Montana Department of Health and Environmental Sciences and request a copy of EPA form 8700-12 "Notification of Hazardous Waste Activity". [40 CFR 262.12, ARM 16.44.403]

Accumulation Time Limit

- Storage of hazardous waste on the generator's property must not exceed 180 days, except if the waste must be transported greater than 200 miles, in which case the waste may be stored for up to 270 days. Hazardous waste may only be transported to authorized treatment, storage, or disposal facilities (TSDF). DHES can assist businesses with locating an authorized facility. This provision is designed to allow Small Generators to accumulate enough waste to justify making a shipment. [40 CFR 262.34 (e-f), ARM 16.44.415]

- Containers or drums must be labeled and dated on the first day that any hazardous waste is placed in them. From this date, each individual container may hold waste for a maximum of 180 days (or 270 days, depending on shipping distance) before it must be

shipped to a TSDF. Wastes may not be transferred from one container to another to extend the allowable accumulation time. [40 CFR 262.34, ARM 16.44.415]

- Small Generators who reach the 6,000 kilogram (13,200 pounds) accumulation limit for total hazardous wastes on site must ship the waste to a TSDF in accordance with the rules in this section.

On-site Treatment

- Under certain circumstances, Small Generators may treat hazardous wastes on their property without a special permit only if the treatment takes place within the 180 day (or 270 day) time limit for storage and only if all container and tank storage requirements presented below are followed, and all necessary precautions taken to prevent spills or accidents. On-site treatment should be discussed with Montana DHES prior to commencement of operations to ensure that all applicable regulations have been followed.

On-site Disposal

- No Small Generator may dispose of hazardous wastes on their property without a **Disposal Permit** issued by EPA or DHES.

Shipment

- Small Generators must ship wastes to a hazardous waste TSDF. Wastes must be shipped using a manifest, and all manifest and waste analysis records must be maintained for at least three years. Care should be taken in selecting a waste hauler and a TSDF since the generator is **still responsible** for the proper management of the waste, even after it leaves his property. The generator should ensure that all hazardous waste haulers and TSDFs have EPA ID numbers. [40 CFR 262.40, 262.44, ARM 16.44.416]

Container Storage

If hazardous wastes are stored in containers (such as drums) the generator must:

- Clearly label each container with the words "Hazardous Waste" and the date on which waste storage begins in that container. Labels can be obtained from DHES.

- Make sure that hazardous waste is not stored in a container that will be corroded, ruptured, or damaged in any way by that waste. [40 CFR 265.172]

- Containers should be closed except when being filled or emptied. [40 CFR 265.173]

- Inspect containers weekly. Keep containers in good shape and replace any that are leaking. [40 CFR 265.174]

- Transfer hazardous waste from leaking containers to different containers. Label the new containers with the start date from the original container. [40 CFR 265.171]

- Never store wastes in the same container if they are non-compatible (reactive, explosive, etc.). [40 CFR 265.177]

- Containers of ignitable or reactive wastes must be stored as far as possible from the facility property line to ensure a buffer zone.

Tank Storage

If hazardous wastes are stored in tanks the generator must: [40 CFR 265.201]

- Inspect tanks weekly and ensure that they are not leaking. Inspect monitoring or gauging systems each operating day.

- Make sure that hazardous waste is not stored in a tank that will be corroded, ruptured, or damaged in any way by that waste.

- Keep the tank covered or maintain at least two feet of freeboard (space at the top of the tank) in uncovered tanks.

- Provide a means to cut off or divert flow of waste into the tank in the event of a problem.

- Abide by National Fire Protection Association requirements for tanks containing ignitable or reactive wastes. These requirements specify the distances needed to establish safe buffer zones for various liquids based on combustible and flammable characteristics. The local fire department or DHES can assist with this.

Emergency Response

- At least one employee must be on hand or on call at all times in case of an emergency, and to be responsible for coordinating emergency response measures. This person is the emergency coordinator and he or his designee must respond to any emergencies.

- Small Generators must post the following information next to the telephone:

  - Name and telephone number of the emergency coordinator

- Location of the fire extinguishers, spill control equipment, and fire alarm

- Telephone number of the fire department, unless the facility is equipped with a direct alarm

- Small Generators must ensure that all employees are thoroughly familiar with the waste handling and emergency procedures relevant to their responsibilities.

- Emergencies that require a response include the following:

  - In the event of a fire, call the fire department or attempt extinguish the fire using a fire extinguisher.

  - In the event of a spill, contain the flow of hazardous waste to the extent possible, and as soon as is practicable, clean up the hazardous waste and any contaminated materials or soil.

- In the event of a fire, explosion, or other release that could threaten human health outside the facility or when the generator has knowledge that a spill has reached surface waters, the generator must immediately notify <u>both</u> the Montana DHES Hazardous Materials Spills Program (1-406-444-6911) and the National Response Center (1-800-424-8802). The report must include the following:

  - The generator's name, address, and EPA identification number

  - Date, time, and type of accident (e.g., spill, fire)

  - Quantity and type of hazardous waste involved in the incident

  - Extent of injuries, if any

  - Estimated quantity and disposition of recovered materials, if any

5.0 WASTE MANAGEMENT PLANS

This section of the manual provides waste management strategies currently available to businesses involved in vehicle and heavy equipment maintenance. Waste management strategies are focused on minimizing the amount of hazardous wastes that could be generated from these operations. These are several advantages of hazardous waste minimization, including:

- Reducing the high costs associated with the management and disposal of hazardous wastes;
- Reducing the liability risks associated with the management and disposal of hazardous wastes;
- Reducing the problems arising from restrictions on land disposal of certain hazardous wastes;
- Minimizing the time and resources required to comply with the hazardous waste management regulations.

Waste minimization practices can include product substitution, process modifications, waste treatment, good housekeeping practices, and recycling and reuse. The selection of a particular waste minimization practice is based upon the industry or business operations, the type of wastes generated and their individual needs and problems.

The following sections describe waste minimization practices for businesses involved in vehicle and heavy equipment maintenance. The practices described have been based on methods currently used by in the industry and are consistent with current RCRA and ARM regulations.

5.1 HAZARDOUS WASTE MINIMIZATION

Vehicle maintenance facilities generate spent solvents, hot tank wastewater and sludges, spent batteries, asbestos-lined brake shoes and clutch linings, paint and paint thinner wastes, and paint booth filters. Waste management practices for reducing the amount of these potentially hazardous wastes are described below.

5.1.1 Spent Solvents

Most of the spent solvents generated as a result of parts cleaning, degreasing, and paint thinning fall into one of the EPA Hazardous Waste Categories of F001-F005 or D001 wastes as discussed in Section 3.7 of this manual. Where practical, steam cleaning and pressure washing should be substituted for solvent parts cleaning. Steam cleaning and pressure washing have limited application, however, they are useful primarily for rough cleaning of parts and equipment. Wastewaters generated from this process can be discharged to the sanitary sewer depending upon waste content and are not regulated as a hazardous waste under RCRA.

Where solvents must be used, there are two viable options for managing them. First, businesses may contract with a licensed hazardous waste management service for disposal or recycling of spent solvents. A second alternative would be to utilize a reclaiming still to recover the solvents. It is very important to keep spent solvent wastes segragated from other waste streams. Mixing solvent wastes with other non-hazardous wastes (including used oil) cause the entire waste to be classified as hazardous.

Reclaiming/Contract Services

A number of companies are available in Montana to contract as waste exchange services for various solvents. Safety Kleen, a reclaiming service for non-chlorinated solvents used in parts cleaning, is based in Spokane and provides service to much of the western portion of Montana. This company provides a parts washer kit consisting of 10-gallon to 30-gallon barrel containing clean solvent with pump assembly and a covered sink with a directable hose. The sink drain contains a filter for removing small particles and keeps small parts from going down the drain. Safety Kleen periodically exchanges dirty solvent for clean solvent.

Another company that provides similar service is Special Resource Management, Inc. (SRM). SRM is currently located in Butte and provides service for a limited area. The company has a portable solvent distillation unit, and will distill solvents on the customer's premises, returning both solvents and still bottoms to the facility, or packaging and shipping the still bottoms to a hazardous waste disposal facility.

Sol-Kleen, a reclaiming firm located in Idaho, provides services for spent paint and lacquer thinner recycling.

Contract disposal services are also available from licensed transporters. Costs to the generator for transportation and disposal range from $100 to $500 per 55-gallon drum. However, since replacement of the solvent is not usually part of this contract service, this may not be as desirable an option for spent solvents.

On-site Distillation

Distillation and reuse of solvents minimizes the amount of solvents which must be disposed as hazardous wastes. Solvents may be re-used over a long period of time with minimal need to purchase new solvent. The distillation process recovers solvents by heating the mixture sufficiently to vaporize the solvent and then condensing the vapor. This process produces clean solvent and a sludge material often referred to as a "still bottom". Still bottoms produced by conditionally exempt generators may be disposed of in a hazardous waste facility, or a licensed Class II sanitary landfill or other facility approved by the State of Montana for industrial or municipal wastes. Generators should notify the landfill operator or owner to obtain approval for disposal. Small generators must dispose of the material as a hazardous waste, which requires shipment to a TSD facility.

There are currently several manufacturers of recovery stills commercially available for on-site solvent recovery. Prices of stills capable of recovering approximately five gallons of solvent from each batch process range from $2,000 to $5.000. Capital cost recovery from stills is generally recognized within one to two years, balanced out by the savings realized from not having to purchase virgin solvents and reduced waste disposal costs.

In addition to parts cleaning, auto body shops may use recovery stills to recycle paint and lacquer thinners. Most facilities with these recovery stills report a high percent product recovery, ranging from 85% to 99% purity. The still bottom material produced is a gelatinous paint sludge that is fairly easily removed from the still. Several auto body shops that

are using the recovery stills mix some of the still bottom material in with their undercoating paint.

5.1.2 Hot Tank Wastes

Both the liquid and the sludges present in hot tanks may be hazardous when disposed. Options for minimizing the amount of hazardous waste generated from these units, includes process chemical replacement, elementary neutralization, and sludge dewatering.

Caustic Chemical Replacement - Replenishment of caustic chemicals in the hot tank, rather than discharge of the entire volume of the tank will aid in minimizing the volume of liquid generated as a hazardous waste. This method involves adding new solution of caustic to the tank as it becomes ineffective for metal cleaning, instead of disposing the entire volume of the tank. Replenishment must be conducted with care to prevent the caustic solution from becoming too concentrated or too dilute. However, the caustic solution will eventually become to dirty to work effectively and will need to be discharged and replaced. Straining the caustic solution through cheesecloth can prolong the usefulness of the caustic.

Sludge Dewatering - The practice of draining sludges in a basket over the hot tank, or allowing liquids to evaporate prior to drumming of the sludge, will serve to minimize the volume of sludge to be treated as a hazardous wastes. The sludge should be allowed to dry to remove any free liquids. Conditionally exempt generators may dispose of the dry sludge at a hazardous waste facility, or a licensed Class II sanitary landfill or other facility approved by the State of Montana for industrial or municipal wastes. The landfill operator or owner should be contacted to obtain approval prior to disposal of this waste. Small generators need to determine if the sludge is a hazardous waste. This can be done by sending a representative sample to an analytical laboratory for EP toxicity analysis. Sludge which is not EP toxic may be disposed in a licensed Class II sanitary landfill. Sludge which is EP toxic must be treated as a hazardous waste and is subject to the requirements discussed in Section 4.0 for small generators.

Wastewater Segregation - In areas not serviced by a municipal sanitary sewer system and treatment facility, other wastewater management alternatives need to be considered, such as discharge to a septic system or a contracted waste pick-up and disposal services. For these alternative wastewater management practices, it is advisable to keep any potentially hazardous wastewaters segregated from the non-hazardous wastewaters. Mixing these wastewaters with non-hazardous wastewaters may result in a mixture that is also a hazardous waste. Keeping these wastewaters separated will reduce the total amount of hazardous waste generated and thus minimize the resources and problems associated with the management of a hazardous waste.

Septic System Discharges - Septic system discharges are a possible wastewater management alternative for hot tank wastes, however, these discharges depend upon regulatory approval. The generator must determine if his waste is a regulated hazardous waste, and if so, then discharge to a septic system is prohibited. Regulatory approval of these discharges will be based on wastewater characteristics, septic system design, and site-specific characteristics.

For this disposal method to be acceptable, the DHES requires that wastewater segregation is practiced. The non-hazardous process wastewaters may be discharged to the septic system. The hazardous process wastewaters must be collected and disposed in a manner consistent with the hazardous waste generator requirements as outlined in Section 4.0, such as a licensed off-site hazardous waste disposal facility.

Contracted Waste Disposal Services - In areas not serviced by a sanitary sewer system or in situations where septic tank discharges of process wastewaters are not an acceptable disposal method, contracted waste pick-up and disposal services may be utilized. Wastewater segregation is advised for this type of waste management option as contracted services that manage hazardous wastes are more expensive and harder to obtain than contract services that manage non-hazardous wastes. In addition, the regulations governing the management of hazardous wastes are more stringent than those for non-hazardous wastes, as described in Section 4.0.

5.1.3 Paint Residues

Minimizing the amount of paint waste generated can be accomplished by product substitution, product inventory control and ensuring that paint containers are empty prior to disposal. Evaporation of liquids may also be used to reduce the quantity of paint waste.

Product Substitution - In some applications, non-hazardous paints can be substituted for hazardous paints. Material Data Safety Sheets should be obtained from the paint manufacturer to determine the constituents of the paints. If non-hazardous paints are substituted for hazardous paints, spillage and waste materials should be absorbed with vermiculite or cat litter and disposed of in a licensed Class II sanitary landfill.

Inventory Control - Paint may be purchased on an individual job basis and/or the unused portion given to the customer for touch-up jobs.

Emptying Containers - Paint containers classified as empty may be disposed of in municipal or industrial landfills. Empty containers are defined as less than 2.5 centimeters (one inch) of product remaining in the container prior to disposal. Where multiple containers of paint are used for single jobs, paint remaining can be combined into a single container, and handled as a hazardous waste, rather than all containers needing to be handled as a hazardous waste.

5.1.4 Spent Lead-Acid Batteries

Spent batteries may be stored at the shop where they are changed out, so long as the battery is not drained before shipment off-site for recycling. The spent batteries should be stored in a designated location away from the main shop area. Draining the battery renders the liquid and the battery hazardous wastes. Thus, off-site recycling is considered the most viable alternative for waste minimization.

5.1.5 Off-spec Aviation Fuel

Attempts should be made by generators of off-spec aviation fuel to contact refineries for possible redistillation of the fuel or other appropriate

uses. Contact should also be made with the local fire department to determine other uses for the off-spec fuel.

5.2 NON-HAZARDOUS WASTE MANAGEMENT

The wastes discussed in this section are termed non-hazardous because they are not regulated by RCRA. However, proper and careful management of these wastes is very important.

5.2.1 Used Oil

Used oils are not currently considered a hazardous waste, unless they are mixed with another waste that is classified as hazardous. There are several waste management options available for managing used oil. Each of them are only for used oil that has not been mixed with a listed or characteristic hazardous waste.

Used Oil Furnaces - Used oil generated by a business may be burned in a commercial space heater which has a capacity of 500,000 BTU or less and is vented to the outside. Used oil may not be collected from other generators, unless the used oil is generated as a household waste (i.e., a do-it-yourselfer), or unless the person delivering the oil is a registered used oil marketer and has certified that the oil meets certain quality specifications outlined in Section 3.4.1.

Recycling - Recycling of used oil is a service provided by collectors of used oil. Most used oil services currently charge the generator a fee to pick up the oil, due to the low price of oil and the cost of recycling. The service should be a registered used oil marketing business and the generator should determine from the service what the final disposition of the oil will be. Services utilizing the oil in an environmentally unsafe manner should not be used!!

In addition to off-site recycling of motor oils, commercial filtration units are available on the market to filter used hydraulic fluid. Other units are available to filter and blend used diesel crankcase oil for supplemental diesel fuel.

Road Oiling - Currently, used oil is not prohibited for dust suppression on roads. The Montana State Water Quality Act prohibits the contamination of public water supplies, surface water, and groundwater. Waste oil may not be used for dust suppresion if it threatens these water resources. The Montana Public Water Quality Act requires that the DHES Water Quality Bureau carefully control activities in public water supply watersheds. Specific Department acceptance of any road dust suppression program must be obtained prior to the initial use of waste oil. Local fire codes may also prohibit the application of used oil on streets and roadways. In addition to obtaining DHES approval, the local fire department or fire authority should be contacted prior to the application of any oil for dust suppression.

Landfilling - Solidified used oil may be disposed of at a licensed Class II sanitary landfill provided it has not been mixed with any hazardous waste. Prior to disposal, the approval of the landfill's operating authority must be obtained. Used oil should be mixed with floor sweeping compounds, vermiculite, or clay absorbent to remove all free liquids prior to sealing the container for disposal or putting the oil in a dumpster for removal.

5.2.2 Asbestos Waste Material

Asbestos waste material generated from brake linings and clutch facings is not regulated by RCRA, but is regulated by other federal and state regulations governing its removal and disposal. The best alternative for managing this material is to recycle the parts to the manufacturer or distributor so they can be relined. Alternatively, the parts may be containerized and disposed in a sanitary landfill, with the permission of the local landfill operating authority.

5.2.3 Antifreeze

Waste antifreeze (ethylene glycol) is not generated in significant volumes. The antifreeze may be saved and poured back into the radiator after the repair work is finished. Alternatively, waste anti-freeze may be further diluted with water and discharged to a sanitary sewer system. Antifreeze should never be poured down a storm drain.

5.2.4 Radiator Test Tank Wastes

Radiator test tank wastes consist primarily of waste water and some sludge. The sludge consists primarily of solder drippings, which may contain lead. The generator should determine if the solder exhibits EP toxicity characteristics for lead. Solder which exhibits EP toxicity must be shipped to a TSD by small quantity generators. Conditionally exempt generators may dispose of the waste in a hazardous waste facility, or a licensed Class II sanitary landfill or other facility approved by the State of Montana for municipal or industrial wastes. The generator should notify the landfill operator or owner to obtain approval prior to the disposal of this waste. If the solder waste is not EP toxic, the waste mixture may be discharged to the sanitary sewer. However, the sludge should always be separated from the wastewater prior to discharge. The solder may be recovered and re-used. If it cannot be reclaimed, the solder may be disposed at a sanitary landfill, if proven non-hazardous.

5.2.5 Spent Glass Beads

Spent glass beads generated during the cleaning of radiators should be tested for EP toxicity (lead). If found to be EP toxic, generators must dispose of the hazardous waste at a TSDF. If not EP toxic, the waste may be disposed in a sanitary landfill.

Appendix A

LIST OF ACUTE AND TOXIC HAZARDOUS WASTES

Table A-1

LIST OF ACUTE HAZARDOUS WASTES
Source: 40 CFR 261.33(e)

Hazardous waste No.	Chemical Abstracts No.	Substance
P023	107-20-0	Acetaldehyde, chloro-
P002	591-08-2	Acetamide, N-(aminothioxomethyl)-
P057	640-19-7	Acetamide, 2-fluoro-
P058	62-74-8	Acetic acid, fluoro-, sodium salt
P066	16752-77-5	Acetimidic acid, N-[(methylcarbamoyl)oxy] thio-, methyl ester
P002	591-08-2	1-Acetyl-2-thiourea
P009	131-74-8	Ammonium picrate (R)
P119	7803-55-6	Ammonium vanadate
P010	7778-39-4	Arsenic acid
P012	1327-53-3	Arsenic oxide As_2
P011	1303-28-2	Arsenic oxide As_2O_5
P011	1303-28-2	Arsenic pentoxide
P012	1327-53-3	Arsenic trioxide
P038	692-42-2	Arsine, diethyl-
P036	696-28-6	Arsonous dichloride, phenyl-
P054	151-56-4	Aziridine
P013	542-62-1	Barium cyanide
P024	106-47-8	Benzenamine, 4-chloro-
P077	100-01-6	Benzenamine, 4-nitro-
P028	100-44-7	Benzene, (chloromethyl)-
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-
P014	108-98-5	Benzenethiol
P001	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, and salts
P028	100-44-7	Benzyl chloride
P015	7440-41-7	Beryllium dust
P016	542-88-1	Bis(chloromethyl) ether
P017	598-31-2	Bromoacetone
P018	357-57-3	Brucine
P021	592-01-8	Calcium cyanide
P022	75-15-0	Carbon bisulfide
P022	75-15-0	Carbon disulfide
P095	75-44-5	Carbonic dichloride
P023	107-20-0	Chloroacetaldehyde
P024	106-47-8	p-Chloroaniline
P029	544-92-3	Copper cyanide
P030	——	Cyanides (soluble cyanide salts), not otherwise specified
P031	460-19-5	Cyanogen
P033	506-77-4	Cyanogen chloride
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol
P036	696-28-6	Dichlorophenylarsine
P037	60-57-1	Dieldrin
P038	692-42-2	Diethylarsine
P041	311-45-5	Diethyl-p-nitrophenyl phosphate
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
P043	55-91-4	Diisopropyl fluorophosphate (DEP)
P004	309-00-2	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5alpha, 8alpha,8abeta)-

Hazardous waste No.	Chemical Abstracts No.	Substance
P003	107-02-8	Acrolein
P070	116-06-3	Aldicarb
P004	309-00-2	Aldrin
P005	107-18-6	Allyl alcohol
P006	20859-73-8	Aluminum phosphide (R,T)
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P008	504-24-5	4-alpha-Aminopyridine
P046	122-09-8	alpha, alpha-Dimethylphenethylamine
P047	[1]534-52-1	4,6-Dinitro-o-cresol and salts
P048	51-28-5	2,4-Dinitrophenol
P020	88-85-7	Dinoseb
P085	152-16-9	Diphosphoramide, octamethyl-
P039	298-04-4	Disulfoton
P049	541-53-7	2,4-Dithiobiuret
P050	115-29-7	Endosulfan
P088	145-73-3	Endothal
P051	72-20-8	Endrin
P042	51-43-4	Epinephrine
P101	107-12-0	Ethyl cyanide
P054	151-56-4	Ethyleneimine
P097	52-85-7	Famphur
P056	7782-41-4	Fluorine
P057	640-19-7	Fluoroacetamide
P058	62-74-8	Fluoroacetic acid, sodium salt
P065	628-86-4	Fulminic acid, mercury(2+)salt (R,T)
P059	76-44-8	Heptachlor
P062	757-58-4	Hexaethyltetraphosphate
P116	79-19-6	Hydrazinecarbothioamide
P068	60-34-4	Hydrazine, methyl-
P063	74-90-8	Hydrocyanic acid
P063	74-90-8	Hydrogen cyanide
P096	7803-51-2	Hydrogen phosphide
P064	624-83-9	Isocyanic acid, methyl ester
P060	465-73-6	Isodrin
P007	2763-96-4	3(2H)-Isoxazolone, 5-(aminomethyl)-
P092	62-38-4	Mercury, (acetato-O)phenyl-
P065	628-86-4	Mercury fulminate (R,T)
P082	62-75-9	Methanamine, N-methyl-N-nitroso-
P016	542-88-1	Methane, oxybis(chloro-
P112	509-14-8	Methane, tetranitro- (R)
P118	75-70-7	Methanethiol, trichloro-
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepen, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P066	16752-77-5	Methomyl
P067	75-55-8	2-Methylaziridine
P068	60-34-4	Methyl hydrazine
P064	624-83-9	Methyl isocyanate
P069	75-86-5	2-Methyllactonitrile
P071	298-00-0	Methyl parathion
P072	86-88-4	alpha-Naphthylthiourea

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Table A-1 (cont'd)

Hazardous waste No.	Chemical Abstracts No.	Substance
P060	465-73-6	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8abeta)-
P037	60-57-1	2,7:3,6-Dimethanonaphth[2,3b]oxirane, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta,6aalpha,7beta,7aalpha)-
P051	72-20-8	2,7:3,6-Dimethanonaphth[2,3b]oxirane, octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6abeta,7beta,7aalpha)-
P044	60-51-5	Dimethoate
P045	39196-18-4	3,3-Dimethyl-1-(methylthio)-2-butanone, O-[(methylamino)carbonyl] oxime
P085	152-16-9	Octamethylpyrophosphoramide
P087	20816-12-0	Osmium oxide
P087	20816-12-0	Osmium tetroxide
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P089	56-38-2	Parathion
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P048	51-28-5	Phenol, 2,4-dinitro-
P047	[1]534-52-1	Phenol, 2-methyl-4,6-dinitro- and salts
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea
P094	298-02-2	Phorate
P095	75-44-5	Phosgene
P096	7803-51-2	Phosphine
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester
P039	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester
P094	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S[2-(methylamino)-2-oxoethyl] ester
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester
P089	56-38-2	Phosphorothioic acid, O,O-diethyl O-(p-nitrophenyl) ester
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P097	52-85-7	Phosphorothioic acid, O-[4-((dimethylamino)-sulfonyl)phenyl] O,O-dimethyl ester
P071	298-00-0	Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester
P110	78-00-2	Plumbane, tetraethyl-
P098	151-50-8	Potassium cyanide
P099	506-61-6	Potassium silver cyanide
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P101	107-12-0	Propanenitrile
P027	542-76-7	Propanenitrile, 3-chloro-
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-
P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)
P017	598-31-2	2-Propanone, 1-bromo-
P102	107-19-7	Propargyl alcohol
P003	107-02-8	2-Propenal
P073	13463-39-3	Nickel carbonyl
P073	13463-39-3	Nickel carbonyl, (T-4)-
P075	[1]54-11-5	Nicotine and salts
P076	10102-43-9	Nitric oxide
P077	100-01-6	p-Nitroaniline
P078	10102-44-0	Nitrogen dioxide
P076	10102-43-9	Nitrogen oxide NO
P078	10102-44-0	Nitrogen oxide NO_2
P081	55-63-0	Nitroglycerine (R)
P082	62-75-9	N-Nitrosodimethylamine
P084	4549-40-0	N-Nitrosomethylvinylamine
P074	557-19-7	Nickel cyanide
P005	107-18-6	2-Propen-1-ol
P067	75-55-8	1,2-Propylenimine
P102	591-08-2	2-Propyn-1-ol
P008	504-24-5	Pyridinamine
P075	[1]54-11-5	Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts
P111	107-49-3	Pyrophosphoric acid, tetraethyl ester
P103	630-10-4	Selenourea
P104	506-64-9	Silver cyanide
P105	26628-22-8	Sodium azide
P106	143-33-9	Sodium cyanide
P107	1314-96-1	Strontium sulfide
P108	[1]57-24-9	Strychnidin-10-one, and salts
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-
[illegible]	[1]57-24-9	Strychnine and salts
P [illegible]	10031-59-1	Sulfuric acid, thallium(I) salt
P10[illegible]	3689-24-5	Tetraethyldithiopyrophosphate
P110	78-00-2	Tetraethyl lead
P111	107-49-3	Tetraethylpyrophosphate
P112	509-14-8	Tetranitromethane (R)
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester
P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium(III) oxide
P114	12039-52-0	Thallium(I) selenide
P115	10031-59-1	Thallium(I) sulfate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P045	39196-18-4	Thiofanox
P049	541-53-7	Thioimidodicarbonic diamide
P014	108-98-5	Thiophenol
P116	79-19-6	Thiosemicarbazide
P026	5344-82-1	Thiourea, (2-chlorophenyl)-
P072	86-88-4	Thiourea, 1-naphthalenyl-
P093	103-85-5	Thiourea, phenyl-
P123	8001-35-2	Toxaphene
P118	75-70-7	Trichloromethanethiol
P119	7803-55-6	Vanadic acid, ammonium salt
P120	1314-62-1	Vanadium(V) oxide
P084	4549-40-0	Vinylamine, N-methyl-N-nitroso-
P001	81-81-2	Warfarin
P121	557-21-1	Zinc cyanide
P122	1314-84-7	Zinc phosphide (R,T)

[1]CAS Number given for parent compound only.

Table A-1 (cont'd)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	(H)
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.	(H)
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra- , penta-, or hexachlorobenzenes under alkaline conditions.	(H)
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5-trichlorophenol.).	(H)
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.	(H)
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing Hexachlorophene sythesized from prepurified 2,4,5-trichlorophenol as the sole component.).	(H)

Table A-2

LIST OF TOXIC WASTES
Source: 40 CFR 261.33(f)

Hazardous waste No.	Chemical Abstracts No.	Substance
U001	75-07-0	Acetaldehyde (I)
U034	75-87-6	Acetaldehyde, trichloro-
U187	62-44-2	Acetamide, N-(4-ethoxyphenyl)-
U005	53-96-3	Acetamide, N-9H-fluoren-2-yl-
U112	141-78-6	Acetic acid, ethyl ester (I)
U144	301-04-2	Acetic acid, lead salt
U214	563-68-8	Acetic acid, thallium (1+) salt
U232	93-76-5	Acetic acid, (2,4,5,-trichlorophenoxy)-
U002	67-64-1	Acetone (I)
U003	75-05-8	Acetonitrile (I,T)
U004	98-86-2	Acetophenone
U005	53-96-3	2-Acetylaminofluorene
U006	75-36-5	Acetyl chloride (C,R,T)
U007	79-06-1	Acrylamide
U008	79-10-7	Acrylic acid(I)
U009	107-13-1	Acrylonitrile
U011	61-82-5	Amitrole
U012	62-53-3	Aniline (I,T)
U014	492-80-8	Auramine
U015	115-02-6	Azaserine
U010	50-07-7	Azirino(2',3':3,4)pyrrolo(1,2-a)indole-4,7-dione,6-amino-8-[((aminocarbonyl)oxy) methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-
U157	50-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U016	225-51-4	3,4-Benzacridine
U017	98-87-3	Benzal chloride
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-diethyl-2-propynyl)-
U018	56-55-3	Benz[a]anthracene
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-
U012	62-53-3	Benzenamine (I,T)
U014	492-80-8	Benzenamine, 4,4'-carbonimidoylbis[N,N-dimethyl-
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-
U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U328	95-53-4	Benzenamine, 2-methyl-
U353	106-49-0	Benzenamine, 4-methyl-
U158	101-14-4	Benzenamine, 4,4'-methylenebis[2-chloro-
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-
U019	71-43-2	Benzene
U038	510-15-6	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy, ethyl ester
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U037	108-90-7	Benzene, chloro-
U221	25376-45-8	Benzenediamine, ar-methyl-
U028	117-81-7	1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)] ester
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester
U107	117-84-0	1,2-Benzenedicarboxylic acid, di-n-octyl ester
U070	95-50-1	Benzene, 1,2-dichloro-
U071	541-73-1	Benzene, 1,3-dichloro-
U072	106-46-7	Benzene, 1,4-dichloro-
U060	72-54-8	Benzene, 1,1'-(2,2-dichloro-ethylidene) bis[4-chloro-
U017	98-87-3	Benzene, (dichloromethyl)-
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl- (R,T)
U239	1330-20-7	Benzene, dimethyl- (I,T)
U201	108-46-3	1,3-Benzenediol
U127	118-74-1	Benzene, hexachloro-
U056	110-82-7	Benzene, hexahydro- (I)
U220	108-88-3	Benzene, methyl-
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-
U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-
U055	98-82-8	Benzene, (1-methylethyl)- (I)
U169	98-95-3	Benzene, nitro- (I,T)
U183	608-93-5	Benzene, pentachloro-
U185	82-68-8	Benzene, pentachloronitro-
U020	98-09-9	Benzenesulfonic acid chloride (C,R)
U020	98-09-9	Benzenesulfonyl chloride (C,R)
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-
U061	50-29-3	Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-
U247	72-43-5	Benzene, 1,1'-(2,2,2-trichloroethylidene)[4-methoxy-
U023	98-07-7	Benzene, (trichloromethyl)- (C,R,T)
U234	99-35-4	Benzene, 1,3,5-trinitro- (R,T)
U021	92-87-5	Benzidine
U202	[1]81-07-2	1,2-Benzisothiazol-3-(2H)-one,1,1-dioxide and salts
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-
U090	94-58-6	1,3-Benzodioxole, 5-propyl-
U064	189-55-9	Benzo[rst] pentaphene
U022	50-32-8	Benzo[a]pyrene
U197	106-51-4	p-Benzoquinone
U023	98-07-7	Benzotrichloride (C,R,T)
U085	1464-53-5	2,2'-Bioxirane (I,T)
U021	92-87-5	[1,1'-Biphenyl]-4,4'-diamine
U073	91-94-1	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-
U091	119-90-4	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-
U095	119-93-7	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-
U027	39638-32-9	Bis(2-chloroisopropyl) ether
U024	111-91-1	Bis(2-chloromethoxy) ethane
U028	117-81-7	Bis(2-ethylhexyl) phthalate
U225	75-25-2	Bromoform
U030	101-55-3	4-Bromophenyl phenyl ether
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-
U031	71-36-3	1-Butanol (I)
U159	78-93-3	2-Butanone (I,T)
U160	1338-23-4	2-Butanone peroxide (R,T)
U053	4170-30-3	2-Butenal
U074	764-41-0	2-Butene, 1,4-dichloro- (I,T)

Table A-2 (cont'd)

Hazardous waste No.	Chemical Abstracts No.	Substance
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[(2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy)methyl]-2,3,5,7a-tetrahydro-1-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S,3R),7aalpha]]-
U031	71-36-3	n-Butyl alchohol (I)
U136	75-60-5	Cacodylic acid
U032	13765-19-0	Calcium chromate
U238	51-79-6	Carbamic acid, ethyl ester
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester
U097	79-44-7	Carbamic chloride, dimethyl-
U114	[1]111-54-6	Carbamodithioic acid, 1,2-ethanediylbis-, salts and esters
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-S-(2,3-dichloro-2-propenyl) ester
U215	6533-73-9	Carbonic acid, dithallium(1+) salt
U033	353-50-4	Carbonic difluoride
U156	79-22-1	Carbonochloridic acid, methyl ester (I,T)
U033	353-50-4	Carbon oxyfluoride (R,T)
U211	56-23-5	Carbon tetrachloride
U034	75-87-6	Chloral
U035	305-03-3	Chlorambucil
U036	12789-03-6	Chlordane
U026	494-03-1	Chlornaphazine
U037	108-90-7	Chlorobenzene
U039	59-50-7	p-Chloro-m-cresol
U041	106-89-8	1-Chloro-2,3-epoxypropane
U042	110-75-8	2-Chloroethyl vinyl ether
U044	67-66-3	Chloroform
U046	107-30-2	Chloromethyl methyl ether
U047	91-58-7	beta-Chloronaphthalene
U048	95-57-8	o-Chlorophenol
U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride
U032	13765-19-0	Chromic acid, calcium salt
U050	218-01-9	Chrysene
U051	8021-39-4	Creosote
U052	1319-77-3	Cresols (Cresylic acid)
U053	4170-30-3	Crotonaldehyde
U055	98-82-8	Cumene (I)
U246	506-68-3	Cyanogen bromide
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione
U056	110-82-7	Cyclohexane (I)
U057	108-94-1	Cyclohexanone (I)
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-
U058	50-18-0	Cyclophosphamide
U240	[1]94-75-7	2,4-D, salts and esters
U059	20830-81-3	Daunomycin
U060	72-54-8	DDD
U061	50-29-3	DDT
U062	2303-16-4	Diallate
U063	53-70-3	Dibenz[a,h]anthracene
U064	189-55-9	Dibenzo[a,i]pyrene
U066	96-12-8	1,2-Dibromo-3-chloropropane
U069	84-74-2	Dibutyl phthalate
U070	95-50-1	o-Dichlorobenzene
U071	541-73-1	m-Dichlorobenzene
U072	106-46-7	p-Dichlorobenzene
U073	91-94-1	3,3'-Dichlorobenzidine
U074	764-41-0	1,4-Dichloro-2-butene (I,T)
U075	75-71-8	Dichlorodifluoromethane
U078	75-35-4	1,1-Dichloroethylene
U079	156-60-5	1,2-Dichloroethylene
U025	111-44-1	Dichloroethyl ether
U081	120-83-2	2,4-Dichlorophenol
U082	87-65-0	2,6-Dichlorophenol
U240	[1]94-75-7	2,4-Dichlorophenoxyacetic acid, salts and esters
U083	78-87-5	1,2-Dichloropropane
U084	542-75-6	1,3-Dichloropropene
U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)
U108	123-91-1	1,4-Diethyleneoxide
U086	1615-80-1	N,N-Diethylhydrazine
U087	3288-58-2	O,O-Diethyl-S-methyl-dithiophosphate
U088	84-66-2	Diethyl phthalate
U089	56-53-1	Diethylstilbestrol
U090	94-58-6	Dihydrosafrole
U091	119-90-4	3,3'-Dimethoxybenzidine
U092	124-40-3	Dimethylamine (I)
U093	60-11-7	Dimethylaminoazobenzene
U094	57-97-6	7,12-Dimethylbenz[a]anthracene
U095	119-93-7	3,3'-Dimethylbenzidine
U096	80-15-9	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U097	79-44-7	Dimethylcarbamoyl chloride
U098	57-14-7	1,1-Dimethylhydrazine
U099	540-73-8	1,2-Dimethylhydrazine
U101	105-67-9	2,4-Dimethylphenol
U102	131-11-3	Dimethyl phthalate
U103	77-78-1	Dimethyl sulfate
U105	121-14-2	2,4-Dinitrotoluene
U106	606-20-2	2,6-Dinitrotoluene
U107	117-84-0	Di-n-octyl phthalate
U108	123-91-1	1,4-Dioxane
U109	122-66-7	1,2-Diphenylhydrazine
U110	142-84-7	Dipropylamine (I)
U111	621-64-7	Di-n-propylnitrosamine
U001	75-07-0	Ethanal (I)
U174	55-18-5	Ethanamine, N-ethyl-N-nitroso-
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-
U067	106-93-4	Ethane, 1,2-dibromo-
U076	75-34-3	Ethane, 1,1-dichloro-
U077	107-06-2	Ethane, 1,2-dichloro-
U131	67-72-1	Ethane, hexachloro-
U024	111-91-1	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-
U117	60-29-7	Ethane, 1,1-oxybis- (I)
U025	111-44-4	Ethane, 1,1'-oxybis[2-chloro-
U184	76-01-7	Ethane, pentachloro-
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-
U218	62-55-5	Ethanethioamide
U227	110-80-5	Ethanol, 2-ethoxy
U359	79-00-5	Ethane, 1,1,2-trichloro-
U173	1116-54-7	Ethanol, 2,2'-(nitrosoimino)bis-
U004	98-86-2	Ethanone, 1-phenyl-
U043	75-01-4	Ethene, chloro-
U042	110-75-8	Ethene, (2-chloroethoxy)-

Table A-2 (cont'd)

Hazardous waste No.	Chemical Abstracts No.	Substance
U166	130-15-4	1,4-Naphthoquinone
U167	134-32-7	alpha-Naphthylamine
U168	91-59-8	beta-Naphthylamine
U026	494-03-1	2-Naphthylamine, N,N'-bis(2-chloroethyl)-
U167	134-32-7	1-Naphthylenamine
U168	91-59-8	2-Naphthylenamine
U217	10102-45-1	Nitric acid, thallium(1+) salt
U169	98-95-3	Nitrobenzene (I,T)
U170	100-02-7	p-Nitrophenol
U171	79-46-9	2-Nitropropane (I,T)
U172	924-16-3	N-Nitrosodi-n-butylamine
U173	1116-54-7	N-Nitrosodiethanolamine
U174	55-18-5	N-Nitrosodiethylamine
U176	759-73-9	N-Nitroso-N-ethylurea
U177	684-93-5	N-Nitroso-N-methylurea
U178	615-53-2	N-Nitroso-N-methylurethane
U179	100-75-4	N-Nitrosopiperidine
U180	930-55-2	N-Nitrosopyrrolidine
U181	99-55-8	5-Nitro-o-toluidine
U193	1120-71-4	1,2-Oxathiolane, 2,2-dioxide
U058	50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U115	75-21-8	Oxirane (I,T)
U126	765-34-4	Oxiranecarboxyaldehyde
U041	106-89-8	Oxirane, (chloromethyl)-
U182	123-63-7	Paraldehyde
U183	608-93-5	Pentachlorobenzene
U184	76-01-7	Pentachloroethane
U185	82-68-8	Pentachloronitrobenzene (PCNB)
U242	87-86-5	Pentachlorophenol
U186	504-60-9	1,3-Pentadiene (I)
U187	62-44-2	Phenacetin
U188	108-95-2	Phenol
U048	95-57-8	Phenol, 2-chloro-
U039	59-50-7	Phenol, 4-chloro-3-methyl-
U081	120-83-2	Phenol, 2,4-dichloro-
U082	87-65-0	Phenol, 2,6-dichloro-
U089	56-53-1	Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-,(E)-
U101	105-67-9	Phenol, 2,4-dimethyl-
U052	1319-77-3	Phenol, methyl-
U132	70-30-4	Phenol, 2,2'-methylenebis[3,4,6-trichloro-
U170	100-02-7	Phenol, 4-nitro-
* U242	87-86-5	Phenol, pentachloro-
* U212	58-90-2	Phenol, 2,3,4,6-tetrachloro-
* U230	95-94-4	Phenol, 2,4,5-trichloro-
U231	88-06-2	Phenol, 2,4,6-trichloro-
U150	148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl) amino]-
U145	7446-27-7	Phosphoric acid, lead salt
U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl-, S-methyl ester
U189	108-95-2	Phosphorus sulfide (R)
U190	85-44-9	Phthalic anhydride
U191	109-06-8	2-Picoline
U179	100-75-4	Piperidine, 1-nitroso-
U192	23950-58-5	Pronamide
U194	107-10-8	1-Propanamine (I,T)
U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-
U110	142-84-7	1-Propanamine, N-propyl- (I)

Hazardous waste No.	Chemical Abstracts No.	Substance
U066	96-12-8	Propane, 1,2-dibromo-3-chloro-
U149	109-77-3	Propanedinitrile
U171	79-46-9	Propane, 2-nitro- (I,T)
U027	39638-32-9	Propane, 2,2'-oxybis[2-chloro-
U193	1120-71-4	1,3-Propane sultone
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U140	78-83-1	1-Propanol, 2-methyl- (I,T)
U002	67-64-1	2-Propanone (I)
U084	542-75-6	1-Propene, 1,3-dichloro-
U152	126-98-7	2-Propenenitrile, 2-methyl- (I,T)
U007	79-06-1	2-Propenamide
U243	1888-71-7	1-Propene, hexachloro-
U009	107-13-1	2-Propenenitrile
U008	79-10-7	2-Propenoic acid (I)
U113	140-88-5	2-Propenoic acid, ethyl ester (I)
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
*U233	93-72-1	Propionic acid, 2-(2,4,5-trichlorophenoxy)-
U194	107-10-8	n-Propylamine (I,T)
U083	78-87-5	Propylene dichloride
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro
U196	110-86-1	Pyridine
U191	109-06-8	Pyridine, 2-methyl-
U237	66-75-1	2,4(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-
U164	56-04-2	4-(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U180	930-55-2	Pyrrolidine, 1-nitroso-
U200	50-55-5	Reserpine
U201	108-46-3	Resorcinol
U202	81-07-2	Saccharin and salts
U203	94-59-7	Safrole
U204	7783-00-8	Selenious acid
U204	7783-00-8	Selenium dioxide
U205	7446-34-6	Selenium sulfide (R,T)
U015	115-02-6	L-Serine, diazoacetate (ester)
* U233	93-72-1	Silvex
U206	18883-66-4	Streptozotocin
U103	77-78-1	Sulfuric acid, dimethyl ester
U189	1314-80-3	Sulfur phosphide (R)
*U232	93-76-5	2,4,5-T
U207	95-94-3	1,2,4,5-Tetrachlorobenzene
U208	630-20-6	1,1,1,2-Tetrachloroethane
U209	79-34-5	1,1,2,2-Tetrachloroethane
U210	127-18-4	Tetrachloroethylene
* U212	58-90-2	2,3,4,6-Tetrachlorophenol
U213	109-99-9	Tetrahydrofuran (I)
U214	15843-14-8	Thallium(I) acetate
U215	6533-73-9	Thallium(I) carbonate
U216	7791-12-0	Thallium chloride
U217	10102-45-1	Thallium(I) nitrate
U218	62-55-5	Thioacetamide
U153	74-93-1	Thiomethanol (I,T)
U244	137-26-8	Thioperoxydicarbonic diamide, tetramethyl-
U219	62-56-6	Thiourea
U244	137-26-8	Thiuram
U220	108-88-3	Toluene
U221	25376-45-8	Toluenediamine
U223	26471-62-5	Toluene diisocyanate (R,T)

Table A-2 (cont'd)

Hazardous waste No.	Chemical Abstracts No.	Substance
U078	75-35-4	Ethene, 1,1-dichloro-
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-
U210	127-18-4	Ethene, tetrachloro-
U228	79-01-6	Ethene, trichloro
U112	141-78-6	Ethyl acetate (I)
U113	140-88-5	Ethyl acrylate (I)
U238	51-79-6	Ethyl carbamate
U038	510-15-6	Ethyl 4,4'-dichlorobenzilate
U114	111-54-6	Ethylenebis(dithiocarbamic acid), salts and esters
U067	106-93-4	Etylene dibromide
U077	107-06-2	Ethylene dichloride
U359	110-80-5	Ethylene glycol monoethyl ether
U115	75-21-8	Ethylene oxide (I,T)
U116	96-45-7	Ethylene thiourea
U117	60-29-7	Ethyl ether (I)
U076	75-34-3	Ethylidene dichloride
U118	97-63-2	Ethyl methacrylate
U119	62-50-0	Ethylmethanesulfonate
U120	206-44-0	Fluoranthene
U122	50-00-0	Formaldehyde
U123	64-18-6	Formic acid (C,T)
U124	110-00-9	Furan (I)
U125	98-01-1	2-Furancarboxaldehyde (I)
U147	108-31-6	2,5-Furandione
U213	109-99-9	Furan, tetrahydro- (I)
U125	98-01-1	Furfural (I)
U124	110-00-9	Furfuran (I)
U206	18883-66-4	D-Glucopyranose, 2-deoxy-2(3-methyl-3-nitrosoureido)-
U126	765-34-4	Glycidylaldehyde
U163	70-25-7	Guanidine, N-methyl-N'-nitro-N-nitroso-
U127	18-74-1	Hexachlorobenzene
U128	87-68-3	Hexachlorobutadiene
U129	58-88-9	Hexachlorocyclohexane (gamma isomer)
U130	77-47-4	Hexachlorocyclopentadiene
U131	67-72-1	Hexachloroethane
U132	70-30-4	Hexachlorophene
U243	1888-71-7	Hexachloropropene
U133	302-01-2	Hydrazine (R,T)
U086	1615-80-1	Hydrazine, 1,2-diethyl-
U098	57-14-7	Hydrazine, 1,1-dimethyl-
U099	540-73-8	Hydrazine, 1,2-dimethyl-
U109	122-66-7	Hydrazine, 1,2-diphenyl-
U134	7664-39-3	Hydrofluoric acid (C,T)
U134	7664-39-3	Hydrogen fluoride (C,T)
U135	7783-06-4	Hydrogen sulfide
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl- (R)
U136	75-60-5	Hydroxydimethylarsine oxide
U116	96-45-7	2-Imidazolidinethione
U137	193-39-5	Indeno(1,2,3-cd)pyrene
U139	9004-66-4	Iron dextran
U190	85-44-9	1,3-Isobenzofurandione
U140	78-83-1	Isobutyl alcohol (I,T)
U141	120-58-1	Isosafrole
U142	143-50-0	Kepone
U143	303-34-4	Lasiocarpine
U144	301-04-2	Lead acetate
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-
U145	7446-27-7	Lead phosphate
U146	1335-32-6	Lead subacetate
U129	58-89-9	Lindane
U147	108-31-6	Maleic anhydride
U148	123-33-1	Maleic hydrazide
U149	109-77-3	Malononitrile
U150	148-82-3	Melphalan
U151	7439-97-6	Mercury
U152	126-98-7	Methacrylonitrile (I,T)
U092	124-40-3	Methanamine, N-methyl- (I)
U029	74-83-9	Methane, bromo-
U045	74-87-3	Methane, chloro-(I,T)
U046	107-30-2	Methane, chloromethoxy-
U068	74-95-3	Methane, dibromo-
U080	75-09-2	Methane, dichloro-
U075	75-71-8	Methane, dichlorodifluoro-
U138	74-88-4	Methane, iodo-
U119	62-50-0	Methanesulfonic acid, ethyl ester
U211	56-23-5	Methane, tetrachloro-
U153	74-93-1	Methanethiol (I,T)
U225	75-25-2	Methane, tribromo-
U044	67-66-3	Methane, trichloro-
U121	75-69-4	Methane, trichlorofluoro-
U123	64-18-6	Methanoic acid (C,T)
U154	67-56-1	Methanol (I)
U155	91-80-5	Methapyrilene
U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one,1,1a,3,3a,4,5,5,5a,5b,6-decachloro-octahydro-
U247	72-43-5	Methoxychlor
U154	67-56-1	Methyl alcohol (I)
U029	74-83-9	Methyl bromide
U186	504-60-9	1-Methylbutadiene (I)
U045	74-87-3	Methyl chloride (I,T)
U156	79-22-1	Methylchlorocarbonate (I,T)
U226	71-55-6	Methylchloroform
U157	56-49-5	3-Methylcholanthrene
U158	101-14-4	4,4'-Methylenebis(2-chloroaniline)
U068	74-95-3	Methylene bromide
U080	75-09-2	Methylene chloride
U159	78-93-3	Methyl ethyl ketone (MEK)(I,T)
U160	1338-23-4	Methyl ethyl ketone peroxide (R,T)
U138	74-88-4	Methyl iodide
U161	108-10-1	Methyl isobutyl ketone (I)
U162	80-62-6	Methyl methacrylate (I,T)
U163	70-25-7	N-Methyl-N'-nitro-N-nitrosoguanidine
U161	108-10-1	4-Methyl-2-pentanone (I)
U164	56-04-2	Methylthiouracil
U010	50-07-7	Mitomycin C
U059	20830-81-3	5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-
U165	91-20-3	Naphthalene
U047	91-58-7	Naphthalene, 2-chloro-
U166	130-15-4	1,4-Naphthalenedione
U236	72-57-1	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl-(1,1'-biphenyl)-4,4'diyl)]-bis (azo) bis(5-amino-4-hydroxy)-, tetrasodium salt

Table A-2 (cont'd)

Hazardous waste No.	Chemical Abstracts No.	Substance
U328	95-53-4	o-Toluidine
U353	106-49-0	p-Toluidine
U222	636-21-5	o-Toluidine hydrochloride
U011	61-82-5	1H-1,2,4-Triazol-3-amine
U226	71-55-6	1,1,1-Trichloroethane
U227	79-00-5	1,1,2-Trichloroethane
U228	79-01-6	Trichloroethylene
U121	75-69-4	Trichloromonofluoromethane
* U230	95-95-4	2,4,5-Trichlorophenol
* U231	88-06-2	2,4,6-Trichlorophenol
U234	99-35-4	sym-Trinitrobenzene (R,T)
U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate
U236	72-57-1	Trypan blue
U237	66-75-1	Uracil mustard
U176	759-73-9	Urea, N-ethyl-N-nitroso-
U177	684-93-5	Urea, N-methyl-N-nitroso-
U043	75-01-4	Vinyl chloride
U248	81-81-2	Warfarin, when present at concentrations of 0.3% or less
U239	1330-20-7	Xylene (I)
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl) oxy]-, methyl ester
U249	1314-84-7	Zinc phosphide, when present at concentrations of 10% or less.

[1]CAS Number given for parent compound only.

* These wastes are also designated as F027 wastes. See Table A-1.

Table A-2 (cont'd)

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Generic:		
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I)*
F004	The following spent non-halogenated solvents: Cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F005	The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I,T)
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.	(T)
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum.	(T)
F007	Spent cyanide plating bath solutions from electroplating operations.	(R, T)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	(R, T)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	(R, T)
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.	(R, T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	(R, T)
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.	(T)
F024	Wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. [This listing does not include light ends, spent filters and filter aids, spent desiccants, wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in Section 261.32.].	(T)
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027.	(T)

APPENDIX B

IDENTIFYING RCRA CHARACTERISTIC HAZARDOUS WASTES

EPA has identified four characteristics which cause a waste to be regulated as a hazardous waste: ignitable, corrosive, reactive, and extraction procedure (EP) toxic. For each characteristic, EPA has developed approved methods for determining whether a waste is hazardous. A brief description of each characteristic and applicable tests follows. The specific definitions of these characteristics are specified in 40 CFR 261, Subpart C.

CHARACTERISTIC OF IGNITABILITY:

A waste exhibits the characteristic of ignitability if a representative sample of the waste is easily combustible or flammable. Examples of these ignitable wastes include paint wastes, certain degreasers, and solvents. The specific characteristics of an ignitable waste include the following properties:

- A liquid that has a flash point of less than 140°F as determined by a specific test method. This does not include aqueous solutions containing less than 24% alcohol by volume.
- It is not a liquid but is capable of causing fire through friction, absorption of moisture, or spontaneous chemical changes under standard temperature and pressure conditions.
- It is an ignitable compressed gas.
- It is an oxidizer.

A waste exhibiting any of these characteristics of ignitablility is identified for regulatory purposes with an EPA hazardous waste number of D001.

CHARACTERISTIC OF CORROSIVITY

A waste exhibiting the characteristic of corrosivity will dissolve metal or burn the skin. Examples of corrosive wastes include waste rust removers, waste acids and alkaline solutions, and waste battery acids. The specific characteristics of a corrosive waste include the following:

- An aqueous waste with a pH less than or equal to 2.0 or greater than or equal to 12.5 as determined by an EPA-approved method.

- A liquid which corrodes steel at a rate greater than 6.35 millimeters (0.250 inches) per year at a temperature of 130°F as determined by specific test methods.

A waste exhibiting any of these characteristics of corrosivity is identified for regulatory purposes with an EPA hazardous waste number of D002.

CHARACTERISTIC OF REACTIVITY

A waste exhibiting the characteristic of reactivity is one that is unstable or undergoes rapid or violent chemical reactions with water or other material. Examples of reactive wastes include cyanide plating wastes, waste bleaches, and other waste oxidizers. The specific characteristics of a reactive waste include the following:

- It is normally unstable and readily undergoes violent changes without detonating.
- It reacts violently with water.
- It forms a potentially explosive mixture with water.
- It generates toxic gases, vapors, or fumes when mixed with water.
- It is a cyanide or sulfide bearing waste which can generate toxic gases, vapors, or fumes when exposed to pH conditions between 2.0 and 12.5.
- It is capable of detonation or a explosive reaction under standard temperature and pressure conditions or if subjected to a strong initiating source or if heated.

A waste exhibiting any of these reactive characteristics is identified for regulatory purposes with an EPA hazardous waste number of D003.

CHARACTERISTIC OF EP TOXICITY

EPA has designed a leaching test, called the Extraction Procedure (EP), to measure the amount of toxic materials that can be extracted from the waste under specific conditions. If the extract obtained from the test exceeds set concentration limits for certain constituents, the waste will be considered hazardous. The EP toxicity test is used to determine whether

leachate from disposal of a particular hazardous waste will pollute ground water.

There are 14 constituents that EPA has established concentration limits for in the EP toxicity test, including 8 metals and 6 pesticides. Each of these contaminants has been assigned a specific EPA hazardous waste number. These contaminants, their associated EPA hazardous waste number, and the established concentration limits are listed in Table B-1. If a representative sample of a waste if found to contain any of the contaminants listed in this table at a concentration greater than or equal to those limits specified, the waste is considered an EP toxic hazardous waste.

Table B-1

MAXIMUM CONCENTRATION OF CONTAMINANTS
FOR CHARACTERISTIC OF EP TOXICITY

EPA Hazardous Waste Number		Maximum Concentration (milligrams per liter)
D004	Arsenic	5.0
D005	Barium	100.0
D006	Cadmium	1.0
D007	Chromium	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0
D012	Endrin (1,2,3,4,10,10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimethano-naphthalene)	0.02
D013	Lindane (1,2,3,4,5,6-hexachlorocyclohexane, gamma isomer)	0.4
D014	Methoxychlor (1,1,1-Trichloro-2,2-bis [p-methoxy-phenyl]ethane)	10.0
D015	Toxaphene ($C_{10}H_{10}Cl_8$, Technical chlorinated camphene, 67-69 percent chlorine)	0.5
D016	2,4-D(2,4-Dichlorophenoxyacetic acid)	10.0
D017	2,4,5-TP Silvex (2,4,2-Trichlorophenoxypropionic acid)	1.0

Source: 40 CFR 261.24

APPENDIX C: REFERENCES AND CONTACTS

FEDERAL REGULATIONS

Code of Federal Regulations: The RCRA regulations addressed in this manual are referenced in the Code of Federal Regulations, Title 40, Parts 260 to 272.

Copies of the Code of Federal Regulations are available in most large public libraries. They may also be purchased from the Government Printing Office by calling (202) 783-3238.

RCRA Hotline: As a public service, the U.S. Environmental Protection Agency has provided a RCRA Hotline where anyone can call for technical or administrative information regarding the RCRA regulations.

The phone number for the RCRA Hotline is: 1-800-424-9346 (Hours from 8:30 a.m. to 4:30 p.m. EST)

References:

(1) "Understanding the Small Quantity Generator Rules: A Handbook for Small Business", published by EPA, Office of Solid Waste and Emergency Response, September, 1986. (EPA Publication No. EPA/530-SW-86-019) This is a handy, easy-to-read, reference for understanding the small quantity generator regulations.

(2) Handbook of Hazardous Waste Management for Small Quantity Generators, by Russell.W. Phifer and William .R McTigue, Jr., Lewis Publishers, Inc., 1988. This book provides a guide to the small quantity generator requirements, waste types generated from various industries, liability considerations, and onsite and offsite management of hazardous wastes.

STATE REGULATIONS

Administrative Rules of Montana: The state regulations addressed in this manual can be found in the Administrative Rules of Montana, Rule 16, Chapter 44.

Montana Department of Health and Environmental Science (DHES): The DHES can provide assistance to anyone with questions or concerns about the federal and state regulations, compliance issues, or waste management practices.

For further information, contact DHES, Solid and Hazardous Waste Bureau, Room B201, Cogswell Building, Helena, Montana, 59620. The phone number is: (406) 444-2821.

Montana Department of Agriculture (DOA): The DOA can provide assistance

to anyone with questions of concerns about the acceptable use of pesticides.

For further information, contact DOA, Environmental Management Division, Agriculture/Livestock Building, 6th and Roberts, Helena, Montana, 59620. The phone number is: (406) 444-2944.